

NON-PUBLIC?: N  
ACCESSION #: 9111080219  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Catawba Nuclear Station, Unit 1 PAGE: 1 OF 04

DOCKET NUMBER: 05000413

TITLE: Turbine/Reactor Trip Due To Installation Deficiency  
EVENT DATE: 10/02/91 LER #: 91-021-00 REPORT DATE: 10/30/91

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: C. L. Hartzell, Compliance Manager TELEPHONE: (803) 831-3665

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

#### ABSTRACT:

On October 2, 1991, at 1200 hours, with Unit 1 at 100% power, a turbine trip resulting in a reactor trip occurred. A vendor, cleaning the area on the 619 elevation of the turbine building with high pressure water, inadvertently sprayed water into electrical box 1TBOX0047 located on the 594 elevation. The water infiltration caused erroneous 2 of 3 high water level signals in Moisture Separator Reheater "D" to initiate a turbine trip, and, subsequently, at 12:00:04 the reactor tripped. An evaluation of plant data has shown that all systems performed as designed following the trip. Procedures EP/1/A/5000/001A, Reactor Trip Response, and AP/1/A/5500/002, Turbine Generator Trip, were entered at 1205 hours, with all systems responding normally. The EP and AP procedures were completed at approximately 1235 hours, and OP/1/A/6100/005, Unit Fast Recovery, was initiated. This event has been attributed to an Installation Deficiency in failing to properly seal the conduit connectors which penetrate the NEMA 4 box. Corrective actions include an inspection of non-safety related NEMA 4 boxes located in the Unit 1 & 2 turbine buildings and

sealing of the connectors as required. The vendor will develop a procedure for proper use of the pressure washer.

END OF ABSTRACT

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## BACKGROUND

The Moisture Separator Reheaters (MSR) EIIS:HX! are provided in the turbine EIIS:TRB! steam cycle to improve the efficiency and reliability of turbine operation. An increase in thermal efficiency and a reduction in damaging low pressure turbine blade erosion may be realized by drying and reheating the wet saturated steam leaving the high pressure turbine.

Three level switches EIIS:XT! are provided in a standpipe arrangement on each MSR shell. The purpose of these level switches is to trip the turbine if any 2 of the 3 switches on any MSR shell indicate high water level in the MSR shell. Although alarms and condenser dump provisions are incorporated on the MSR drain tanks EIIS:ACC!, this final precaution ensures that damage due to turbine water induction does not occur.

The electrical wiring EIIS:CON! for level switches, 1HSL6170, 1HSL6171, and 1HSL6172, for MSR "D" are routed to terminal box 1TBOX0047, along with the wiring for MSR "C". The terminal box is located on column IL-28 on the 594 elevation of the Unit 1 turbine building. MSR "D" is located above the terminal box on elevation 619, with metal conduit routed between them.

The Bill of Materials Sheet (BOM), CNBM-1749-01.01-09, specifies that the terminal box be type NEMA 4. NEMA 4 boxes are used in areas where dust or moisture may be present. Connectors for this box are not specified on the BOM.

## EVENT DESCRIPTION

On the morning of October 2, 1991, K-Mac, a vendor service, began cleaning the 619 elevation of Unit 1 turbine building with a Coleman 3000E pressure washer. Prior to beginning this work, K-Mac contacted Operations for clearance. Concerns were expressed to Operations during the cleaning, about mist being drawn by the turbine exhaust fans EIIS:BLO! past ITXE electrical cabinets located on the 594 elevation of the turbine building. An Assistant Shift Supervisor was dispatched to the area for an evaluation. He was satisfied that the cleaning could proceed.

At 1155 hours on October 2, 1991, the control room began receiving Turbine/Generator Control annunciator EIIS:ANN! alarms. Operators responded to the Alarm Summary and found that instrument 1HSL6172 was indicating "failed". At that time the Unit Supervisor was notified. At approximately 1159 hours, 1HSL6172 returned to normal and 1HSL6170 went into alarm. Each of these instruments swapped states several times, each alternating from failed to normal. At 1200 hours, both instruments entered the "failed" position which satisfied the two of three logic on high water level in Moisture Separator Reheater (MSR) "D". This logic tripped the turbine, which tripped the reactor as a result of a turbine trip above P-9 (69% reactor power).

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At approximately 1205 hours, Operations entered EP/1/A/5000/001A, Reactor Trip Response, and AP/1/A/5500/002, Turbine Generator Trip. All systems responded as designed after the trip, and at 1235 hours, the EP and AP procedures were completed. Upon the completion of these procedures, Operations entered OP/1/A/6100/005, Unit Fast Recovery.

## CONCLUSIONS

This event has been attributed to an Installation Deficiency in failing to properly seal the conduit connectors which penetrate the NEMA 4 box. The water infiltration occurred in box 1TBOX0047, located on the 594 elevation of the turbine building, approximately 25 feet from the ITXE electrical cabinet. The water condensate drained down the outside surface of the conduit which carries electrical conductors from the MSR into the box. Box 1TBOX0047 is type NEMA-4, which is both dust and waterproof.

Internals of this, and several other boxes, were modified by a Nuclear Station Modification (NSM) in February 1991. At that time, several of these boxes were observed to be rusted inside. Water infiltration was believed to have begun upon the initial installation of these boxes.

Although the use of the spray washer initiated this event, this problem could have occurred at any time, especially when condensation was prevalent in the turbine building.

Box 1TBOX0047 was repaired by applying silicon sealer around the connector to box interface to prevent further water intrusion. Maintenance Engineering Services will initiate a Work Request(s) to inspect and reseal, as required, all non-safety related NEMA 4 boxes located in Unit 1 & 2 turbine buildings. All safety related boxes are currently being inspected on a regular basis.

K-Mac Services is now in the process of developing a procedure to instruct its personnel on proper usage of the Coleman 3000E pressure washer.

A review of the OEP database for the past 24 months did not reveal any events similar to the one addressed in this report. This incident does not meet the Nuclear Safety Assurance definition as a recurring problem.

## CORRECTIVE ACTIONS

### SUBSEQUENT

1) Operations entered EP/1/A/5000/001A, Reactor Trip Response, and AP/1/A/5500/002, Turbine Generator Trip, procedures.

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2) OP/1/A/6100/005, Unit Fast Recovery entered upon completion of EP and AP.

### PLANNED

1) MES will initiate a Work Request(s) to investigate and seal (as required) non-safety related NEMA 4 boxes located in Units 1 & 2 turbine buildings. (Safety related NEMA 4 boxes are currently inspected on a regular basis.)

2) K-Mac will develop a procedure for proper usage of the Coleman 3000E pressure washer.

## SAFETY ANALYSIS

At the time of this event, Unit 1 was operating at 100% power. The reactor trip occurred due to erroneous signals tripping the turbine. Following the reactor trip, reactor power immediately decreased to zero. No primary or secondary power operated relief valves or code safety valves were lifted during the event.

Reactivity was controlled by the reactor trip. All rods E1IS:ROD! inserted, as expected. This event is bounded by the Turbine Trip Analysis contained in Section 15.2.3 of the Catawba Final Safety Analysis Report (FSAR). At no time was the health and safety of the public affected by this event.

Duke Power Company (803)831-3000  
Catawba Nuclear Station  
P. O. Box 256  
Clover, SC 29710

DUKE POWER

October 31, 1991

Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: Catawba Nuclear Station  
Docket No. 50-413  
LER 413/91-21

Gentlemen:

Attached is Licensee Event Report 413/91-21, concerning TURBINE/REACTOR TRIP DUE TO INSTALLATION DEFICIENCY.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

W. R. McCollum  
Station Manager

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Catawba Nuclear Station

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